Groundwater isotopes in ecohydrological analysis of peatland landscapes

Samer Elshehawi

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Samer Elshehawi
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by

Samer Enan Ali Abdelsalam Elshehawi

born on 14 September 1988
in Cairo, Egypt

Supervisors
Prof. A.P. Grootjans
Prof. J. van der Plicht

Co-supervisor
Dr. P.P. Schot

Assessment Committee
Prof. J.T.M. Elzenga
Prof. R. van Diggelen
Prof. H. Joosten

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Preface

On a slightly cold and rainy October day in 2014, I visited a peatland in the Drentsche Aa brook valley. As a person who has never set foot in a peatland before, and who has done geological field work in dry areas, I had no boots or rain gear. The outcome of the day was not pleasant at all. After a few times of falling in ditches or tripping over unseen plant roots, I was cold, wet and holding grudge feelings for all peatlands of the world. My relation with peatlands was not off to a great start or to a love at the first sight to say the least. However, over the past few years my perception of peatlands has become one of admiration and respect. After people find out that my work is related to peatlands, they often ask: “uh, but are there peatlands in Egypt?”. The answer is probably no, at least in the present. As a guy who grew up in a grey city, Great Cairo, I have not had much exposure to natural landscapes, except for the vast sand dunes in the desert. It is, hence, a valid point to wonder how did an Egyptian guy gets bogged into peatland sciences. Well, the answer consists of a series of (un)fortunate events.

The first event was the beginning of the Egyptian revolution in early 2011, which overlapped with the last year of my bachelor study. While I was studying petroleum geosciences, I had little to no enthusiasm to actually pursuing a career in the oil and gas industry. The revolution was a catalyst, which led me to participating in a human rights summer school upon finishing the bachelor study. After the summer school, I was enthusiastic about pursuing a career in human rights related direction. However, I still liked to approach that from a scientific point. The logical option was to change course into environmental sciences to combine the geology background with human rights into environmental justice. While trying to find an environmental science study program, a scholarship from Erasmus Mundus landed me in the Netherlands at the end of the summer of 2013 to follow the research master program (Energy and Environmental Sciences) at the University of Groningen.

While adapting to the new education system and learning new things, a disappointment was growing by following the course shift in Egypt from a hope of a brighter future to a gloomy and violent one. This has made rethink whether or not I wanted something to do with Egyptian affairs anymore, specifically water management in Egypt. Due to the confusion, I went to meet my appointed tutor, who was appointed to me because he had something to do with water. And there he was Ab Grootjans, the “peat guy” as I remembered his lectures. After listening to my complaints and doubts about doing research about water management in Egypt, he said “you have some basic knowledge in hydrology. Right? Well, there is a project and I need a student to do some research on the groundwater age in a nature reserve in Drenthe, so think about it”. I accepted the offer.

After finishing the Drentsche Aa project, I flew to the southern hemisphere to start a new field work adventure in Maputaland in South Africa. After a 12-hour flight, Ab introduced me to his Afrikaans colleague: Piet-Louis Grundling, who was to decide our fate. Piet-Louis wasted no time. We drove over the night for another 8 hours to arrive

in the beautiful landscapes of Maputaland. After a small stop to drop our baggage. We took off to the field with Marvin, Sihle and Mohamed. Our visit was to the Vasi peatland complex, where I met the second peatland, which was quite a different experience. Unlike the wet climatic conditions in the Netherlands, the peatlands in Maputaland sustain their development, despite the net dry conditions, where evapotranspiration is estimated to twice as much as precipitation. The focus of the study was to save what is left undestroyed by the fire yet, Vasi-North, but in 2017 the fire took over it too and left it a witness of the costs of unsustainable land use practices, namely forestation here. During the same visit, I had the opportunity to visit the beautiful Matlabas mire in the Waterberg mountain areas with Piet-Louis and Althea, where we did some quick fieldwork. Afterwards I was back in Maputaland, and left trying to recover from a mean tick bite, under the care of Marvin and Caro who were kind enough to take me to the hospital. While staying in Maputaland for five weeks, Marvin was kind enough to show me the peatlands, where he was doing his research, and each one of them was unique.

By the completion of the master's degree, I had some financial help by Ab on behalf of Ecological Restoration Advice (ERA) foundation to publish our work. Henk Everts and Nico de Vries were kind enough to offer me a space in their office to work from. Besides this, I was assisting other colleagues with some ecohydrological research in the province of Drenthe in the Netherlands and in Slitere National Park in Latvia. In Latvia, I got to meet more interesting people like Mara, Olgerts, Leszek, Alma and Christ-Janis, with whom we ran around the whole park to install water pipes, flush them and take samples in just a few days. By the end of the year, we applied for the new PhD scholarship scheme to do a thesis to combine these separate projects into a research highlighting the positive role of the groundwater isotopes in ecohydrological research of peatlands. This was not going to be possible without the help of Rien, Hans and Harro.

During the PhD period, we did extra fieldwork in Vasi, Matlabas and Slitere to improve our understanding of these systems and to look into some of the questions that were still unanswered. The plans to improve the work was done with the help of Paul Schot and Martin Wassen, who were nice enough to have me as a guest at the environmental sciences research group of Utrecht University. Together, we worked to improve the manuscripts and plan and execute the fieldwork in South Africa and Latvia. Also, the last fieldwork was done in Slitere National Park with the help of a master student: Alvaro, from Utrecht University, who completed a master project on modelling the groundwater flows in Slitere.

By the end of my PhD, the cherry on top of the cake was participating in the IMCG excursion in the Netherlands. I got to meet many beautiful people, with whom you get to appreciate peatlands beauty. However, I still failed to have a peat-only-diet for more than four hours, I will look forward to doing so next time. I am thankful to everyone who I met, shared a discussion or a beer. I look forward, and hope, to continue working closely to peatlands, to learn more and more about them. After all, I hope to sing along "Bring back my boggy to me" for many years to come.

Samer Elshehawi,
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